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ABSTRACT

This paper examines the benefits to be derived from networked computer-based instruction (CBI) and discusses the potential of the World Wide Web (WWW) as an effective tool in employee training. Methods of utilizing the WWW as a training tool and communication tool are explored. The discussion is divided into the following sections: (1) "WWW and Communications Technology," including the pivotal role of communication technologies in shaping the practice and character of employee training; (2) "Computing and Employee Training," including the benefits of CBI such as increased interaction among remote learners, cooperative training environments, learning as a team process, and self-directed learning; (3) "WWW from Internet to Intranet," including the development of Internet accessibility from the 1980s to the present; (4) "WWW Training," including design of tutorials and online lessons, as well as the Web's potential for interactivity; (5) "WWW Reports," including the Web's versatility as a publisher; (6) "WWW Assessments"; and (7) "WWW Q & A," including news-groups, the Common Gateway Interface (CGI) protocol, and computerized search agents. It is concluded that--in order for information technology productivity gains to be realized--new technologies must be used in innovative ways to increase the productivity of training. (Contains 6 references.) (MES)

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Reading the writing on the graffiti wall: The World Wide Web and training.

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Abstract

This paper examines the benefits to be derived from networked Computer Based Instruction (CBI) and discusses the potential of the World Wide Web (WWW) as an effective tool in employee training. Methods of utilizing the WWW as a training tool and communication tool are explored.

WWW and Communications Technology

Communication technologies have assumed a pivotal role in shaping the practice and character of employee training. Just as the construction of the railroad-based postal service contributed to the growth of correspondence study in nineteenth century America and the later inventions of radio and television expanded both the audience and instructional format of adult and continuing education , current advancements in technology are having a profound effect on how and when people learn (Khale, 1996).

In addition to technological advances, recent global changes in economic, social and political realities have accentuated the need for employee training. Frequently, these changes have resulted in business restructuring and the lay-off of employees. This instability creates the need for constant updating of skills since knowledge has become one of the most important economic resources. Information is rapidly expanding and its lifetime is becoming increasingly short, so continuous retraining of workers is required. Investment in human resources is considered by many to be the key to sustainable development (Peraya, 1994).

Computing and Employee Training

Advances in communication technology and the advent of computers in particular have transformed the traditional delivery of training as well as the nature of the audience. Media have become more specialized and designed for smaller audiences. The electronic media, once thought of as mechanical and ridged, now have the ability to individualize training information. Computer Based instruction (CBI) offers vast potential for interaction among instructors, learners, and business institutions. While a combination of audio, text and video are among the benefits to employee training, CBI is also lauded for its equity and convenience, providing an environment where learners can contribute to class discussions when and as often as they like without fear that their ethnicity, sex, or physical disability will influence the evaluation of their comments (Khale, 1996).

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CBI's greatest contribution to employee training is increased interaction especially among remote learners. Cooperative training environments can now be established and maintained, and learning as a team process is possible. Other possibilities include self-directed learning by a single employee and collaborative learning between two employees as well as effective facilitation of group discussions within an "electronic classroom". As a result, training programs may benefit from communication technologies by providing additional learning opportunities for new employee populations. Employees working at remote sites throughout the world with widely differing time zones can now receive the same quality of instruction previously reserved for employees at the home office. New technologies have already changed the organizational structure of traditional business institutions and the effect on training will be equally profound.

WWW from Internet to Intranet

In an attempt to realize the benefits of computing in the 1990's business employees began to navigate cyberspace on the world's largest computer network, the Internet. The Internet is a global network of computers which has rapidly gained in popularity outside the scientific community that designed it. Despite e-mail and other network services, the Internet was incomprehensible to the vast majority of employees. May early computer network functions were based on a series of complex protocols which demanded a knowledge of computers and network operating systems. Understandably, employees lacked both the time and interest to attain these skills.

While the Internet possessed the technical capacity to handle a variety of complex applications, the network was not user-friendly and it uses were limited. In the 1980's researchers at the University of Minnesota created gopher. Gopher is a network standard that guides the user from one file to another, as well as from one computer to another. Although, gopher soon became noted for its ability to store and present information over the Internet, its limitations were equally apparent. It is limited to presenting text files, not allowing the display of graphics, and it is difficult to distinguish among its uniform menus.

To overcome these constraints, a new protocol was devised. In 1989 at the European Particle Physics Laboratory (CERN) in Geneva, a British computer scientist Tim Berners-Lee developed a protocol called the World Wide Web. In addition to allowing Internet publishers to intertwine information in multiple categories, the Web presented new features. For instance, the same screen presented texts and links to other information. One can simply highlight key words with a mouse and link them to other documents on the Internet. These documents in turn can be

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further linked to more specific information. A key feature of the Web is its ability to present information in a multimedia context that includes graphics, audio, and video.

Today, the Web is more accessible since it is no longer confined to research sites for experimental work. This was made possible when programmers at the University of Illinois at Urbana/ Champaign released the Mosaic browser in 1993. Browsers interpret Hyper Text Mark-up Language (HTML) which stipulates how a Web page will look to its viewers. Accessibility further increased with the introduction of other browsers like Netscape and Internet Explorer. These developments lead many companies to establish internal "Intranets" or Web based computer servers accessible only to internal company users and clients, but with links to the Internet. With millions of Web servers around the world, the World Wide Web, originally reserved for the research community, is now a powerful force on the Information Highway and possesses untold potential for employee training.

WWW training

Due to its ability to present information clearly, attractively and quickly, the Web has established itself in the arena of training as a significant instrument of andragogy. As a result, when one converts a text document into a Web document, using a simple word processing program or HTML editor, the result is a user-friendly on-line document. Therefore, the Web can easily be used to design tutorials and on-line lessons.

A noted example of using the Web as a teaching tool is a hyperbook written by Roger Schank and Chip Cleary of the Northwestern University's Institute of the Learning Sciences. As one of the leading minds in artificial intelligence Schank maintains that learners should be allowed to learn what interests them. He further asserts that "instead of being forced to memorize the quadratic equation, for example, learners should question how it may relate to their lives and only then come up with a good reason to learn it". In other words, he advocates the Socratic method which stipulates that learning must be based on questions, not on provided answers. With this logic in mind, Schank and Cleary's hyperbook clearly fulfills the needs of probing minds as its categories provide the user with different viewpoints from which to begin. Although many of Schank's ideas are designed for traditional education, the need for problem solving and flexibility on the part of today's business employees makes his ideas applicable to most current training situations.

Despite these inroads, the potential of Web tutorials has yet to be realized. In order for this innovation to become widespread it will be necessary for trainers to design Web tutorials for non-technical subjects and best

business practices. With the World-Wide Web, any trainer can transform a topic of choice into a living, breathing document that would be more than just useful and informational to learners, it would also be interesting.

Undoubtedly, one of the key advantages of the Web as a training tool is its potential for "inter-activity". Despite the hype and rhetoric regarding this buzzword in training, empirical analysis does support the efficacy of interactive learning. Research shows that learners' training experiences are more meaningful when they are actively involved in the process. This assertion challenges the traditional notion of the passive classroom and suggests a need for restructuring the old ways of training and learning. in order for today's employees to remain competitive in tomorrow's marketplace, yesterday's training methods must changed.

One way is to engage learners from a variety of viewpoints and allow them to feel part of the subject matter. This may ensure more interest in the subject and result in learners spending more mental energy to achieve a more complete understanding of the content. To this end, Roger Schank proposes that learning be attained through the use of goal-based scenarios. The facilitator, with a set of learning objectives in hand, allows the learners to explore the subject from their own particular point of view. Schank further suggests that when learners are encouraged and given the proper opportunity and medium, they are better able to express a wealth of perspectives on a wide variety of subjects. Provided with the opportunity to articulate and express their thoughts, learners can grasp the meaning of the training and thus understand it better. The World Wide Web and company Intranets are ideal places to test Schank's propositions.

WWW Reports

The Web's versatility as a publisher makes it a rich resource. Traditional, reports and presentations can be a tedious exercise both for the presenter and the recipient. However, the Web makes it possible to present information not only within a company but to other interested clients far and wide. For instance, instead of presenting information in a conventional, report format, a Human Resource employee can use the Web as a publishing tool to create an in-depth "hyper-report", an on-line multimedia site with links leading to numerous sub-topics and network connections. With such a report each of the employees in a department or on a project team could view a summary of a current project and then receive specific in-depth information regarding there individual parts by simply clicking on a hyper-link.

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WWW Assessments

Training assessment and establishing the cost effectiveness of training has been a frequent dilemma for business (Jones, 1996). Many companies are placing emphasis on higher order thinking skills and more complex forms of assessment. In the area of training assessment Intranets and HTML documents can facilitate the assessment of learning portfolios. Howard Gardner has suggested the idea of a processfolio. Unlike a portfolio, a processfolio includes every single creative step towards some particular goal. In the case of a major training case study, learners would include all comments and criticisms made by the instructor and other learners. They would also include their own personal interpretations of that criticism - in other words, a meta-assessment of a work-in-progress. In the end, the processfolio would demonstrate the learner's growth, as well as the completion of the work.

WWW Q & A

A significant attribute of the WWW is its ability to function as a marketplace of ideas and information particularly within the training community where it can serve as a forum for debate and discovery.

Due to the establishment of network standards, it is now possible for Web designers to create a hypermedia news-group forum using programs such as listserv. People can join a discussion by sending a subscription message to a listserv computer. From then on, they can receive and post information to the listserv, which will then distribute the information to others on the list. Such programs can be set up within a company on an Intranet and they are more productive then the endless forwarding of e-mail among department members or project teams. These news-groups can also create international e-mail forums which can provide valuable information to people in the Human Resources and training field. Web sites such as Dejanews provide lists of news-groups on-line.

A protocol known as Common Gateway Interface (CGI) allows one to fill out on-line forms and have the information processed in a variety of ways. These on-line forms have become common ways of ordering goods and services via the Internet in virtual stores or catalogues. This type of form can be useful in training through the development of what are commonly known as graffiti walls. On entering a graffiti page, one can fill out a form with comments on whatever that Web page is about, such as a training program. The CGI program will then automatically tack the message onto the page itself, so future site visitors will be able to read the comments. This is a great way to collect comments on training programs, assuming that the comments are positive, and a good way for dispersed learners to question facilitators and each other about training materials and activities.

The World-Wide Web is beginning to take the form of a World-Wide Library Catalogue. However, unlike a traditional library, the books that are available have been created by learners, instructors, and anyone who has something to say. Web crawlers and other agents systematically navigate the Web in search of new information to organize (Lynch, 1997). While some on-line searches can be daunting, the development of computerized search agents such as "webworms", "spiders", and "knowbots" make surfing less tedious. Also, the recent trend in resource cataloging or the development of annotated resource guides divide sites into subjects which are then processed into HTML with a synopsis of the site. It is not surprising, therefore, that third or fourth graders can create a Web project on a favorite subject, like dinosaurs, and once this project is discovered by a search agent, it will be accessible by other children who want to learn about Triceratops and Tyrannosaurus Rex. It is obvious that as the World-Wide Web grows, so will easy access to useful and interesting information. It is also obvious that much of that information will be foolishness, rumors and deliberate falsehoods. Human Resource professionals may want to protect their companies and colleagues by using the graffiti wall concept to collect and debunk myths and rumors about their companies.

Conclusion

Despite the investment of $500 billion in hardware and software by businesses in the United States in 1996 alone, information technology has yet to create substantial gains in productivity and profits (Gibbs, 1997). In order for these productivity gains to be realized, new technologies must be used in innovative ways to increase the productivity of training. Intranets and communication technology may also assist employees in maintaining and increasing their skill levels without the need of on-site facilitation by trainers. This would allow trainers to spend more time on instructional design and media creation in addition to doing less frequent yet more in-depth training sessions. The days of endless and repetitive "employee orientation" and benefits seminars may be coming to a close. On-line training techniques such as hyperbooks, processfolios and graffiti walls may be a first step in creating the knowledge economy of the 21st Century.

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